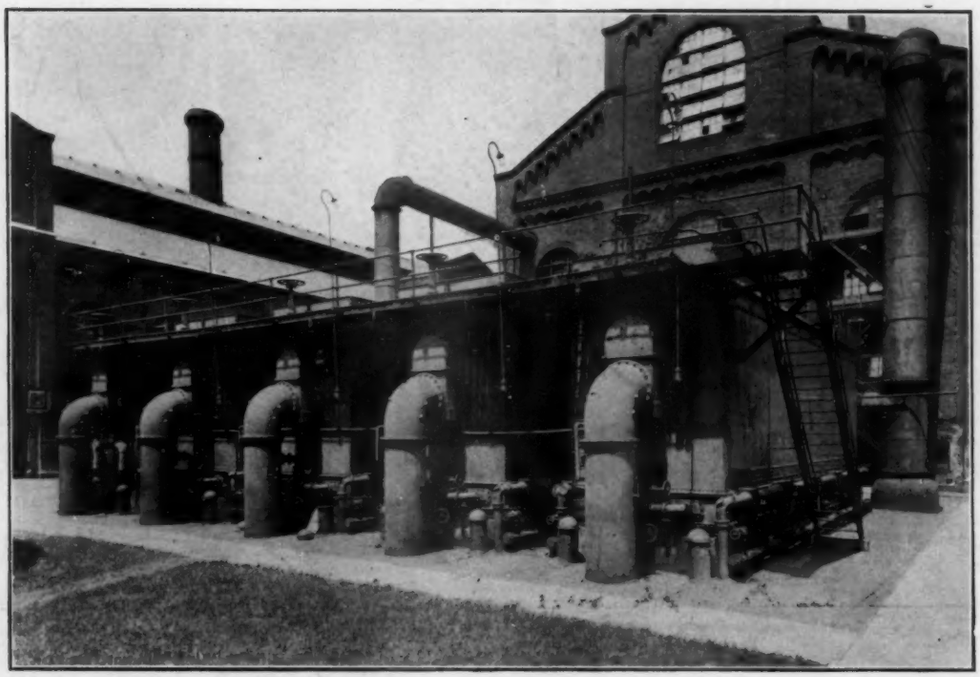
AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry

VOL. 122 NO. 13
WHOLE NO. 3113 NEW YORK, SATURDAY, MARCH 28, 1925 Subscription, $6 Per Year
$4 Canada $8 Foreign



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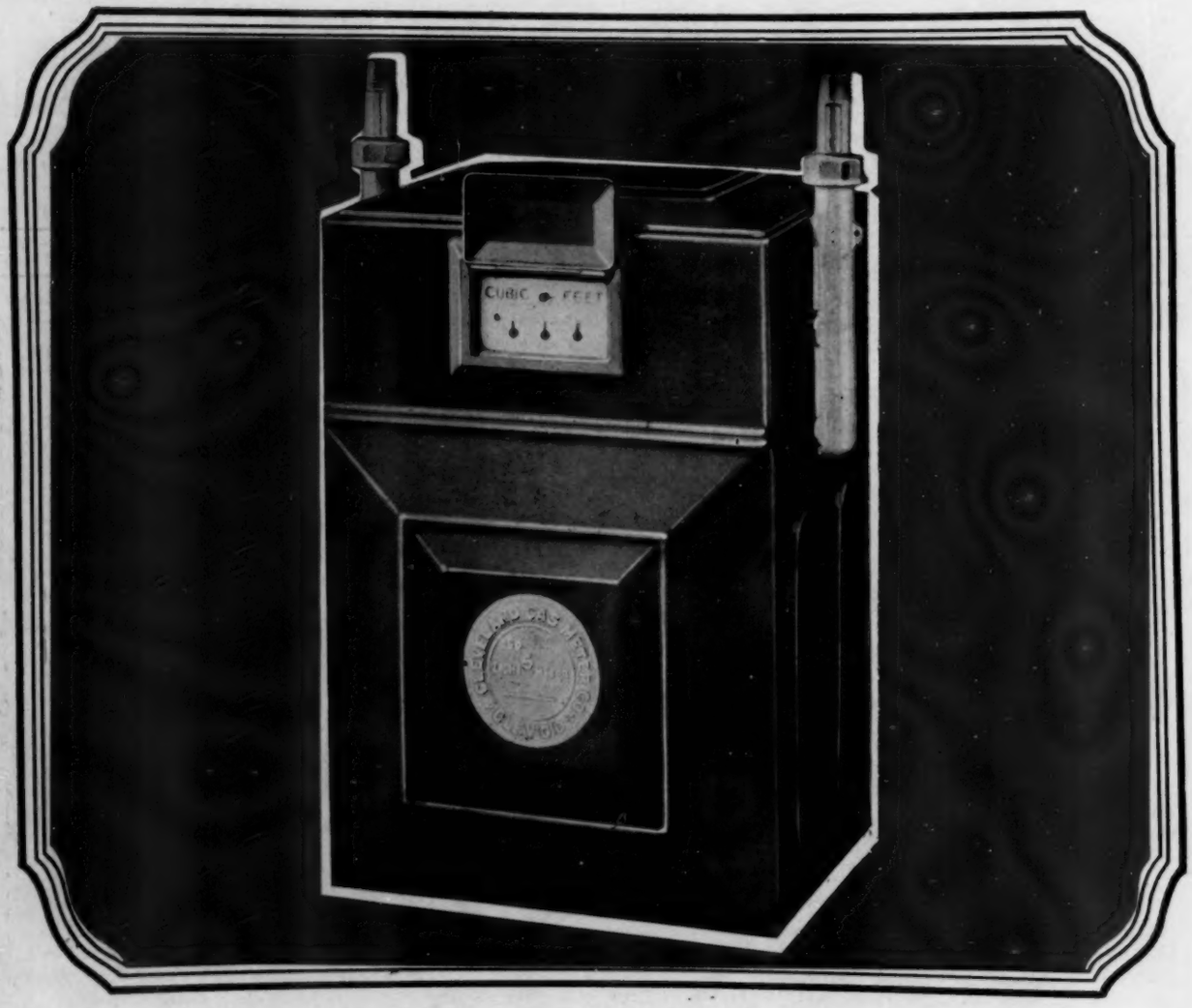

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American Gas Journal

SIXTY-SIXTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, Pres. & Treas. C. S. MYERS, Vice-Pres. A. M. GLEASON, Sec'y.

STANTON G. KRAKE, Managing Editor ISMAR GINSBERG, Editor

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Subscription $3.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents.

AMERICAN GAS JOURNAL, March 28, 1925. Vol. 122. No. 13.
Published weekly by American Gas Light Journal, Inc., New York, N. Y.
Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

AMERICAN
GAS JOURNAL

Vol. 122. No. 13 NEW YORK, MARCH 28, 1925 Whole No. 3513

Fuel of the Future. What Shall It Be?

XIX. Heat treatment of metals—Tempering and Toughening

Ismar Ginsberg

TWO important heat treating operations on steel were discussed in the two articles of this series directly previous to this one, namely, the annealing and the hardening of steel. The next operation that must be considered is the tempering and toughening of steel.

It has been shown that one of the principal processes of heat treatment, in which gas finds important uses, is the hardening of metals, particularly of steel, in order, for example, that the proper cutting edge can be put on a tool. In this process the steel is heated to a high temperature and then suddenly cooled by plunging into water. Great hardness is given the metal by such treatment, but along with this advantageous property the steel product attains a very disadvantageous one in being rendered so brittle that it cannot be used except for a few minor purposes. The steel is not able to withstand the demands that would be made upon it when used in the common way, and, consequently, it is necessary to treat the steel still further with the aid of heat in order to bring it into the proper condition.

In this connection the further heating of the metal relieves the hardening strains. But, not only that, for by the proper regulation of the temperature of the reheating furnace it is possible to adjust the degree of hardness that is obtained in the finished product to any desirable point. The degree of tempering can be told by the color on the brightened surface of the metal. The color that is seen thereon bears a definite relation to the temperature of the treatment and varies from a very faint yellow to a blue. These are known as temper colors. After the proper color has been observed, the general practice is to quench the metal so as to stop further development of color.

The Temperature

One of the fundamental conditions in the process of tempering metals is the temperature of the furnace. It is absolutely necessary that the furnace temperature be controlled as accurately as possible. This is more than usually important, because of the fact that the range of temperature within which the various tempering operations takes place is very limited. Thus the following tabulation, which gives the degrees F. that correspond to various temper colors will be of interest to the industrial gas man who is concerned with this field and will enable him to make his calculations from information supplied to him regarding the temper color that the manufacturer wants to obtain in his product.

Table of Temper Colors

Temperature in degrees F.	Color.
420	Very faint yellow.
430	Yellowish white or light strow.
440	Light yellow.
450	Pale straw yellow.
460	Straw.
470	Dark yellow.
480	Deep straw.
490	Yellow brown.
500	Brown yellow.
510	Brown.
520	Brown purple (peacock).
530	Light purple.
540	Purple.
550	Dark purple.
560	Light blue.
570	Blue.
600	Dark blue.
625	Blue tinged with green.

The important characteristic of this tabulation is that the entire range of tempering temperatures is only a little over 200 degrees Fahrenheit, and there is a very small difference, at times 10 degrees, and at the most 30 degrees, between individual colors.

Hence it is evident that in order to secure a definite degree of tempering it is absolutely necessary that the temperature of the furnace be under perfect control at all times.

Gas as a Fuel for Tempering Furnaces

This condition is what makes gas particularly advantageous as a fuel in tempering furnaces. The temperature of the furnace can be very accurately regulated when gas is used in it, which is more than can be said for other fuels whose combustion cannot be so readily controlled. The industrial gas salesman should be cognizant of this fact and be ready to use this argument with telling effect on his prospect.

Tempering of metal is carried out in different media. Each method carries its own peculiarities and adaptabilities for certain conditions. The metal products are sometimes covered with a tempering plate, and then again the sand bath and the oil bath may be used as well. Lead, alloys and molten salts are also employed for this purpose.

The Tempering Melt

An interesting tabulation which may also be of use to the gas engineer who is working this field is the lead-tin alloy fusion point table, which shows the approximate temperatures at which various alloys of this series that are used in the tempering melt. The table follows:

Lead parts	Tin parts	Approx. temperature degrees F.
14	8	420
15	8	430
16	8	440
17	8	450
18.5	8	460
20	8	470
24	8	480
28	8	490
38	8	510
60	8	530
96	8	550
200	8	560
melted lead	0	610 to 630

Here, again, it is seen that the temperature differentials are rather small and that the temperature must be accurately controlled through the proper, regulated combustion of the fuel in order to obtain good results.

The Toughening of Steel

Another heat treating operation that is carried out on steel products is known as toughening. Toughening as well as tempering relates to a change that takes place in the structural characteristics of the steel. Toughening is merely an extension of tempering and its action ensues when the steel is heated at a higher temperature than what is prevalent in the tempering operation. The toughening range of temperatures is included approximately between 750 and 1,250 degrees F. While these temperatures may generally be taken to be sufficient to accomplish the toughening of the steel, nevertheless, such considerations as the degree of hardening, the size of the work, the difference in chemical composition of the metal, etc., all play their part.

Effect of Toughening

Toughening makes the steel better able to perform certain tasks. It makes possible for the steel to bear up against greater loads. It increases the ductility of the metal. Then, again, it renders the steel article able to withstand the action of impact loads.

The application of heat in the toughening process is surrounded in general with conditions that are similar to those that have been discussed under annealing and hardening. The temperature must be

A Large Gas Burner Used in a Steel Mill

controlled and this means that the combustion of the fuel must be such that it can be accurately regulated. Gaseous fuel offers certain important advantages in this case as well as in the others. In other words, the toughening of metal is an operation which is carried on most effectively with the aid of gaseous fuels. It is as much a field for gas as hardening and annealing of steel.

Case Carburizing

Another important process in the heat treatment of metal is case carburizing. The purpose of this process, which is also known as case hardening, is to produce a hard surface on the metal while retaining the internal toughness of the same. In other words, a low carbon steel will possess the hardness of special steel on its surface and still retain the original and inherent toughness of steels of its class.

There are two steps in this process, which will be discussed in few words, so as to give the industrial man sufficient information regarding it. The first step in the process consists in carburizing or impregnating the surface of the metal with substances which will result in increasing the hardness of the

(Continued on page 277)

Co-operating With the Architect

A most important matter to any gas company

W. A. Adams

Peoples Gas Light & Coke Company, Chicago, Ill.

TO my mind, the necessity of co-operating with the architect and the builder, for the purpose of securing additional openings, is the most important step to be taken on the road to our goal which, of course, is the greater use of gas.

Here is a class of men that is not reached through the regular advertising channels, because these men are deluged with literature and advertising all sorts of construction material, and the like, and it is consigned to the waste basket, so that newspaper or direct mail advertising is a wasteful expenditure so far as this class is concerned. Even though such advertisements meet their eye, they are merely glanced at, and no lasting impression is made.

I believe you will agree with me that it is a good policy, from the viewpoint of the gas industry, to have buildings adequately piped for gas, and surely there is no better opportunity to have this provision made than at the time an architectural project is on the way.

The foundation of the business that is done by the largest heating and cast iron pipe manufacturers in this country is laid out on the drawing tables in the architect's office, and he finds it good business policy to have a corps of experts always on hand.

Personal Contact Necessary

Allow, then, that this is obvious. Then comes the question, what is the best way to go about this work, and my answer is, by personal contact with the architect. I can assure you that the result of co-operation with the architect by personal contact will be productive of results that will be agreeably surprising.

First of all, there should be in every gas company a department whose work it would be to call on the architects in various territories for the purpose of offering its services in advising on all matters pertaining to gas.

Character of Men Engaged in Work

The men engaged in this work should be the best men you have. They should have a comprehensive knowledge of the gas business; that is, as applies to piping, meter locations, etc. They should be men of experience, who are capable of giving correct information as to the cost of main extensions and service charges. They should be able to lay out a plan of piping buildings, advising where meters should be placed; should know what appliances to suggest; they should be able to specify the proper size of piping and openings, and, in short, to be of assistance to the architect and the builder in all matters that pertain to gas company business. They should be men of bearing, who can tell the complete gas story in a dignified way, and by all means be men who can, when necessary, explain rules which, to the uninitiated, seem arbitrary, but which will, upon proper presentation, prove to be beneficial to the customer. They should have a talking knowledge of all appliances handled by their company so that they can have gas fired appliances called for in the specifications.

Piping Specifications

For the residence, bungalow, and two flat building, we should aim to get piping specified, so that openings can be left for radiant heaters, water heaters and laundry equipment, such as washers and dryers, house heating boilers and gas refrigerating machines.

In the larger flat buildings we should work to get additional openings specified for fireplaces, laundry dryers and storage water heaters. In the industrial type of buildings, we should aim to have building services of sufficient size so that the demand of the consumer can be supplied. While it is not always known what class of tenant is going into the commercial or industrial building, and what his demands for gas will be, we should point out that it is a wise precaution to run a building service pipe of, say, three inches in diameter, to the top of the building, leaving full tee openings on each floor, as the difference in cost of material between the sizes we aim to get and the sizes of, perhaps, one inch or one and one-quarter inch in diameter is really not sufficient to consider, while the difference in the labor cost for installing the larger pipe is practically negligible. In these days of the concrete type of structure, the wisdom of installing large building services is apparent, because, if it were necessary to provide a larger gas line than was originally installed after the building is ready for occupancy, the cost would be greatly in excess of what it would have been if done when the building was under construction.

We should impress on the architect and the builder the importance of providing piping for individual heating systems; such as gas-steam radiators, heating boilers and steam boilers.

Office Buildings

Office buildings should be provided with gas openings for the use of doctors, dentists, barber shops,

(Continued on page 280)

*Presented before the convention of Illinois Gas Association (21st annual meeting).

Selling Appliances to New Residences

A few suggestions that have good results

Frank H. Williams

NEW homes are a particularly fertile field for the gas appliance salesman, because people naturally want new gas appliances in their new homes.

But there is very frequently to be overcome the opposition of expense. The new home owners have put so much money into their new homes that they do not feel inclined to spend more money for appliances, no matter how much they would like to have them.

Some salesmen, therefore, find it difficult to sell new gas appliances to new residences, while, on the other hand, other salesmen put sales across in new homes with frequency and ease.

How Is It Done?

How do the most successful gas appliance salesmen put across their sales to new residences?

Undoubtedly the methods used will be of interest to other salesmen.

Some of the most interesting and striking of the methods employed by particularly successful gas appliance salesmen in selling new appliances to new homes, as told to the writer by these salesmen, are the following:

Goes to New Homes With a Complete Proposition for the Entire House

"I've found in long experience," said a central states appliances salesman, "that if I go to a prospect with a proposition that the prospect buy $400 worth of gas appliances from me, it is a lot easier to sell the prospect $100 worth of appliances than if I started out right in the first place to make a sale of $100 worth of appliances to him.

"The drop from the first large sum to the smaller sum makes the smaller sum seem like nothing at all.

"That's the principle I work on in making sales of gas appliances to the owners of new homes.

"When I tackle a new home-owner I outline a proposition to him for a complete equipment of gas appliances from top to bottom. I suggest to him that he buy the most expensive gas range we sell. I suggest to him that he equip his house completely with heaters from top to bottom. I suggest that he install an ironing machine. And so on and so forth through the entire line-up of gas appliances carried by us.

"I go after him hard on this proposition of complete gas appliance equipment for his home, too. There's no telling but what I'll be able to put the sale over just as I've outlined it, you know. I try hard to sell him on the whole proposition and, of course, I quote him a price for the entire equipment.

"Of course, the cost for such a complete job is way up in the air. But, even so, there are times when I do put such sales across.

The Cost Too High for the Average Prospect

"With the average prospect, however, the price seems something enormous. The prospect realizes that he can't afford to buy such a complete equipment, but, nevertheless, he feels rather flattered to think that I have conceived him capable of making such a purchase. So he feels decidedly friendly toward me.

"I turn this friendly feeling to very good account indeed.

"All the time that I have been trying to sell the prospect on the idea of complete gas appliance equipment for his home I've been finding out just what gas appliances he really needs. Generally, the thing most needed is a new range—a white and gray one which will be in perfect keeping with the handsome new kitchen in the handsome new home.

"So, after being turned down on the complete equipment for the entire home, I concentrate on the proposition of selling a new gas range to the prospect.

"And the drop in price is so great and the relief to the prospect of not feeling as though he ought to completely equip his entire house with gas appliances is so great that it is very frequently the case that I have very little trouble in selling a new range.

"That's the method I use in selling gas appliances to new residences and just as this method has worked out so very successfully for me, it would probably work out with equal success for other salesmen."

Sizes Up New Homes Before Approaching Prospects

"It is the easiest thing in the world to get into a new home, just about the time it is finished and before the family moves in, and size up the place," said a Western gas appliance salesman. "Almost all new homes are open and visitors aren't barred.

"I make it a practice of keeping fairly accurate track of the new homes going up in my territory and just about the time that the homes are almost completed I go around to the homes and visit them and size them up carefully. I take note of the general layout of the homes and I note the place where the gas range is going to be placed and I also take note of places where other gas appliances could be placed.

"Then, so that I won't forget the things thus learned, I take out a pencil and paper and draw a little plan of each home.

The Plan Interests

"Armed with this plan, I go to the people who are going to live in the home and I take the plan out

(Continued on page 274)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 63

Heat and Change of State

Effect of Pressure

THERE is still another factor which influences the melting temperature of substances, and that is the pressure of the atmosphere. It is always important to specify the pressure when speaking of the melting temperature of a substance. If this is not done, then it is generally assumed that the pressure is that of the atmosphere. The melting points which will be referred to in these lessons will always refer to atmospheric pressure.

Melting point and pressure are connected in a very definite manner. Increase in pressure always tends to lower the melting point. The reason for this appears quite evident, when we consider that when a solid is subjected to pressure there is a tendency to convert it from the solid to the liquid condition. Thus, it is possible to liquefy certain solids by the application of pressure alone. The application of great pressure to a solid, that is, squeezing it very strongly, naturally has the result of lessening the intense cohesion of the molecules, or, in other words, the application of great pressure tends to destroy to a certain extent the molecular forces that hold together the particles of the substance in solid form. When the temperature is increased, and the pressure is continued, the latter assists the liquefying action of the temperature. Heat tends to liquefy the solid, and so does pressure. Hence it is self-understandable that when pressure is applied at the same time as heat, the melting temperature of the solid is reduced.

Effect of Pressure Reduction

Then, on the other hand, when the pressure is decreased, the melting point is raised. Thus, when a piece of tin is placed in a vessel, from which the air has been exhausted, more heat will have to be applied before the metal reaches its melting point than if the heating were carried out in the free air. Furthermore, if air is forced in under pressure into this vessel, the melting temperature is lowered. If tin melts at 450 degrees F. in open air, when the pressure is reduced the melting point of the metal will be more than 450 degrees C., and when the pressure is increased the melting point is less than 450 degrees C.

Melting Point and Solidification Point

The melting point refers, of course, to solids. It implies the rise of the temperature to that point where fusion occurs, the solidification point is therefore just the opposite of the melting point. It implies the reduction of the temperature of a liquid until that point is reached where solidification or congealation takes place. However, it is not always true that the melting point and the solidification point of a substance are at the same temperature. It sometimes happens that the solidification of the molten solid takes place at a lower temperature than the melting of the solid itself. In all melting point and solidification point determiantions it must be remembered that all those substances are generally melted or solidified at the ordinary atmospheric pressure. For this reason the values which are given in the following tabulation are for atmospheric pressure only.

EFFECT OF PRESSURE ON MELTING POINT
Hydraulic Press
Great Pressure will cause particles of Metal to Move from one slab of metal into the other
Slabs of Metal
Pressure Lessens Cohesion of Molecules Just as Does Heat.
25 lbs
The Melting Point of the Substance is — Reduced in proportion to the Pressure Applied
Similarly Decrease of Pressure will cause Melting Point to Rise.
Pressure Applied to Melting of Substances

GAS WRINKLES

Cement-Joint

Wolff Volk

San Diego Consolidated Gas and Electric Company

THE accompanying picture shows the strength of a cement joint and flexibility of a cast iron pipe. The average time to make and amount of material used will give an idea of its success. No skilled labor is required and also may be made against gas pressure. The method used is as follows:

The pipe is laid in the usual way, only more dirt is used to hold pipe firm, the hemp (dry stainless long fiber) used is generally cut a little longer than the diameter of the pipe. The cement Colton, Riverside

and Victor brand may be used; the latter stands test best. The cement is sieveted on a piece of canvas or sack, the sieveting box being made of wood 18x 12x4 inches, a slush-box used and is made of 18 or 20 gauge galvanized sheet iron 22x16x8 inches, or any ordinary bucket will do. In this a slush of cement 3 parts of water and 2 parts of cement are mixed and are changed every 15 or 25 minutes, according to brand of cement used. The mixing box, 20½x15x 2 inches, galvanized iron, is used to mix the cement. It is mixed by hand, is kneaded like making bread, and the consistency like soft putty. Rubber gloves are used for mixing and making joints. Only enough cement is mixed that can be used immediately. Two strings of hemp 8 to 10 strands each, or that can be freely pushed in the bell without being cut with yarning iron, are soaked in the slush a few minutes, when ready for use are stirred thoroughly in the cement, then loosely stripped off with one hand and yarned in the bell. The cement already mixed when patted with hand a little water appears is about right. It is then forced in by hand until flush with bell and a little tamping with yarning iron once around will pack it sufficiently. The second string is then wrung out fairly dry and yarned in on top of cement and left even with bell; if facing shows it being too wet, a rag or sack may be used to dry up the moisture. Then a facing is put on, a few swipes will make a smooth finish; if wiped, too much water will appear and the cement is apt to drop at the bottom. A wet sack is put over joint to keep sun from cracking the face.

The pipe as shown in photograph was tested at 90 pounds air pressure for some time and no signs of leaks appeared. By adding weight on the end of pipe, the joint showed a slight crack, with 50 pounds weight, and held 20 pounds air pressure, but began to show bubbles at 30 pounds. This test was made when joints set 54 hours.

Average Time and Material

Size pipe	Amt. cement	Amt. hemp	Time per joint
4 in.	2¼ lbs.	⅛ lb.	8 min.
6 in.	2¾ lbs.	¼ lb.	9 min.
8 in.	4¼ lbs.	⅜ lb.	10 min.
10 in.	5 lbs.	½ lb.	12 min.
12 in.	6 lbs.	⅝ lb.	15 min.

GAS STOVES MAKE AMERICAN WOMEN BEAUTIFUL

The increasing use of gas in the kitchens of the country has been a leading factor in the preservation of youth and beauty to the modern American woman, according to the report of a recent meeting of physical culture experts.

The use of cosmetics and the bobbing of hair were held to be merely superficial aids to beauty. Increased leisure and better health, both largely attributable to modern gas service, are among the fundamental reasons for the high standard of beauty in the United States, according to the report, which says:

"Women no longer fill coal buckets, carry ashes, split kindling or soak corn-cobs in coal oil to do their cooking on a coal-fed kitchen range.

"Housewives are no longer required to supply fuel to maintain constant temperature in baking; the gas oven heat regulator permits them to enjoy the time thus saved as their pleasure dictates. No more sweltering in a kitchen as hot as the oven itself. No more staying at home to replenish the coal oil reservoir.

"The modern woman doesn't have to carry buckets of water in which to do the family washing or to heat for bath water. Her gas-fired water-heater does that for her.

"Results? Fairer hands and nails. Lovelier faces and figures. Better tempers. Prettier skin and cleaner, more attractive hair. More time for enjoyment, leisure and rest. All of which means youth and beauty."

As The Journal Views It

COMPETITION

Economists tell us that competition is that ever-prodding spur that leads to progress. They cite cases wherein the absence of competition has led to disastrous results because the incentive for progress has not been active. Then, of course, instances occur wherein too severe competition has been almost as bad as none at all.

For long years the gas industry has been considered to be free from competition. It has possessed the character of a monopoly. Consequently, it was subject to laws and legislations of special character which do not apply at all to ordinary business. There is no question but that presence of some sort of governmental control is proper in a monopolized industry. Nevertheless, there have been abuses of such regulations, with the result that the industry in question has not been allowed to develop properly to the detriment of all concerned.

Whether fortunately or not, the gas business today has lost a certain part of its original monopolistic character. It has become, in a certain sense, a business controlled by competitive conditions. In other words, the time has now arisen where the gas company must take into consideration the fact that in order to secure certain kinds of business, it has to meet and withstand competition from other sources.

It is clear that the cause of this change has been the acquirement of industrial business which is growing larger year after year. Gas, as an industrial fuel, must compete with other fuels, and it must be able to overcome its competitors if its use is to increase. There are certain forms of this competition which are not as severe as others and which the gas company need pay little attention to. There is no real competition between gas and coal, for example, when used in the industrial furnace. Furthermore, competition between gas and oil is not such a serious matter and in time will become even less serious than it is today. Oil cannot hope to remain a real factor in the industrial heating fuel unless some radical change takes place to gainsay the predictions that have been made regarding available supplies of oil still remaining to be derived from the earth.

On the other hand, the real serious competition that gas has to meet in the industrial field is electricity. And here, strange to say, it is not because electricity is a cheaper fuel than gas, for in the greatest majority of cases it is not, but simply because the electrical business is operated with a keen appreciation of the opportunities that electricity has as a heating agent, even though the actual cost of fuel consumption will unquestionably be increased when it is used. The electrical man has had a big battle to fight for his industrial business and he has not been deterred or discouraged by the fact that it was surrounded with great difficulties. He has managed to overcome these and to secure and maintain industrial business by superior service, by developing appliances which solve the problem in so effective a manner that the manufacturer is glad to use the electrically-heated apparatus and pay more for his fuel.

What the electrical man has done the gas man can also accomplish. For, in most cases, he has the advantage at the outset that his fuel does not cost as much as electricity per heat unit. He also possesses a fuel that is as flexible as electricity in all its applications as a heating agent and that can give just as efficacious results with the same saving in labor, fuel and operating expense as the electrically heated furnace.

Both the gas man and the electrical man have the same problem facing them. They must introduce a more expensive fuel to replace a less efficient one, and they can only do so and secure permanent business if, at the same time, they effect an improvement in the manufacturing process. This is the real function of gas as an industrial fuel and fortunately it possesses all the characteristics that are required of a fuel that can give these results.

Gas in Hell

A new way of firing the everlasting fires

Edward G. Cooney

THEY'RE having a Hell of a time in Hades.

It all started with an article, "O Hell!" in The Houghton Line. It was recorded that the Chief of the Apostate Angels had called a convention of the Council of Imps of Beelzebub, one from every heavenly body in the universe.

During the convention the Prince of Darkness had planned to have an extra portion of torment served to the trillions of souls in agony in order that there might be music to liven the delegates.

The Prince of Darkness thrives on the torment of souls, but of late they have become so accustomed to the torment served that his fiendish glee finds no satisfaction.

The Secretary of Home, who has charge of the light, heat, power and reception, has been getting panned because of his failure to produce proper torment.

The convention was opened and Mephistopheles addressed the gathering as "You Damned Devils." He then gave them Hell because the arrival of new souls was gradually becoming less and less. He called for a report from the "Master Devil From Earth."

Now the M. D. F. E. had various alibis and excuses that did not entirely satisfy His Satanic Majesty. At one time during the recital He excoriated the M. D. F. E. for "passing the buck."

At the close of the convention, and after the Master Devil From Earth had returned to his usual place of abode, the Damned Official Stenographer transcribed his notes and passed them along to His Satanic Majesty. The Devil perused them very closely and went into a rage when he read this excerpt from the story of the Master Devil From Earth: "I need not tell one so wise as your Majesty that there is nothing new on Earth." Mephistopheles tore his hair, thrashed his tail about and raved thunderously about the failure of the Damned Devil From Earth to keep souls coming and also about this failure of the Secretary of Home to produce new Devilish thrills.

His Satanic Majesty had lately been advised that on earth there was a new power, or, rather, old power rightly used, which was knocking Hell out of his fire of brimstone and sulphur.

He sent a hurry call to the Master Devil From Earth to return for a secret conclave. When the M. D. F. E. arrived there was Hell to pay in the office of His Satanic Majesty. Those who were near could hear Mephistopheles talking of a power called Gas. He repeated the word many times and told of the secret reports he had from earth about the wonders being performed by this great power.

Suddenly the door of His Satanic Majesty's office opened and the Master Devil From Earth left in a hurry, saying, "Your Majesty, I shall make a complete investigation and return soon with a report."

Shortly after, a large sign was hung in front of the office of His Satanic Majesty, which read:

"IF IT'S DONE WITH HEAT YOU CAN DO IT BETTER WITH GAS."

Selling Utility Stock By and to Women

One-half of utility stockholders are women

Fay Monroe

WOMEN have succeeded in this field because every woman is equipped by nature to sell and because 50 per cent of the stock clients are women, a large percentage of them being housewives.

The outstanding reason for the popularity of utility securities to housewives is the intimate way with which they come in contact with the utility company. They do not have to be told that those utilities supply a service that is absolutely essential. They know it because they are using it all the time. They recognize the advantage of becoming part owners in a utility company.

Convince Yourself First

Some of the salesmanship axioms that we must master are:

First, you must thoroughly sell yourself on the proposition before you try to sell anyone else. This means, we must first convince ourselves by study and by actually investing. A saleswoman can talk thrift and sell securities on the monthly savings plan basis much more effectively if she has acquired a few shares of stock by monthly saving.

Thorough Knowledge Necessary

Know thoroughly what you are selling. Many women do not know the difference between stock and bonds. A share of stock is an evidence of part-

(Continued on page 279)

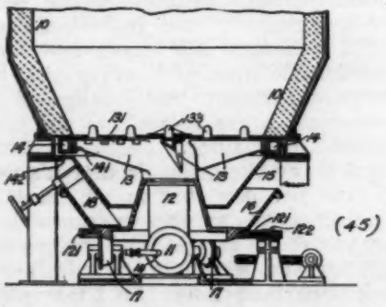
PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

INCREASED GAS YIELD FROM RETORTS

STEAM is blown into a horizontal retort at the discharge end and, passing over red-hot coke, converted into water gas. This immediately comes into contact with the freshly-charged coal and its sensible heat promotes the distillation of the volatile products. The external heating of the retort and the admission of steam are so regulated that the primary distillation gives as high a yield of coke as possible.—(German Patent No. 401,273.)

GAS PRODUCER

THE gas producer which is seen in the accompanying illustration is patented in United States Patent No. 1,525,792. This apparatus comprises a fixed shell, a blast tube below the shell.



The tube carries perforated arms and a hollow, perforated ring on these arms. Means are provided for rotating the tube and for supplying air to it.

DEGASIFICATION AND REACTIVITY OF CARBONISED FUELS

BEECH charcoal and different varieties of coke were heated in an electrically heated quartz tube at a constant temperature and at progressively rising temperatures. With a rise in temperature of about 160 to 170 degrees per hour, the quantity of gas evolved per unit of time was approximately a linear function of the temperature, once the evolution of gas had started. In the case of gas-coke, evolution of gas started between 750 and 900 degrees, in spite of the fact that the coke had been heated to at least 1,000 degrees in the retorts.

Experiments at constant temperature were conducted in three groups; heating in stages at 800, 1,000 and 1,100 degrees, at 1,000 and 1,400 degrees and at a constant temperature of 1,000 degrees. In the first set, the evolution of gas was vigorous at first in the first two stages, but ceased after two to three hours, while on heating to 1,100 degrees, the evolution was slower at first, but continued for a longer time. On heating beechwood charcoal to 1,100 degrees, 15 litres of gas per 100 g. of anhydrous charcoal were evolved in the first seven minutes, but the rate of evolution slowed down rapidly; on heating to 1,400 degrees, evolution was again vigorous for a short time.

The gas obtained always contained a high percentage of hydrogen, together with carbon monoxide and nitrogen; the proportion of nitrogen was fairly constant during the whole range of heating, and seldom rose above 10 per cent.The gases obtained from charcoal having a high gas content contained methane, except when distillation was carried out above about 1,000 degrees. Towards the end of the distillation the gases had a composition similar to that of water gas. Very little hydrogen sulphide was present in the gases. The degrees of reactivity of different varieties of charcoal were compared by the continuous analysis of the gases obtained by passing a constant current of air over the charcoal in particles of about 5/3 mm. diam., heated to progressively higher temperatures in a quartz tube. The ignition temperatures in air and in oxygen and the velocity of combustion in air were also taken into consideration.—(Monats Bull. Schweiz. Ver. Gas und Wasserfachin, 4,7201-5 ff.)

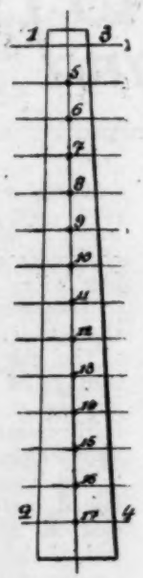
MANUFACTURE OF GAS WITH INTRODUCTION OF STEAM

THE yield of gas from the retort may be increased by the injection of a current of steam. The advantages and disadvantages of this method are well known. The steam cools off the retorts or chambers, effecting some changes in the walls of the same and gasifying a part of the red hot coke, which results from the distillation of the coal. The result is that the ash of the original coal becomes concentrated in so small a volume of coke that remains after the process is concluded that this coke becomes unsaleable.

These inconveniences are avoided by means of the process which is the subject of this invention. It consists in the introduction of a hydrogenerating atmosphere in the retorts or the furnace chambers in which the distillation of the coal takes place. The result is that the partial concentration of the hydrogen in the chamber or retort will always be greater than at any other point in the mass of coal that is undergoing treatment. This results in the decomposition of the hydrocarbon constituents of the coal.

The trajectory of a particle of coal, which is introduced at 1—3, as shown in the accompanying figure—and is removed at 2—4 in the form of coke,

is indicated in its various positions by the figures 5 to 17. If a change is not made in the gaseous medium of variable composition which is created by the distillation of that particle of coal in the course of its progress through the retort, it will be seen that the partial tension of the free hydrogen in the gas evolved from the particle of coal in each of its positions, 5, 6, 7, etc., will increase from 5 to 17.



The average concentration of the hydrogen in the entire gas thus set free is 50 per cent. The partial concentration of 0.5 for hydrogen will be realized at the position 12 of that particle. This concentration will then be lower for all other positions below this point and higher for the positions 13 to 17 inclusive.

The result, then, is that if a hydrogenation mixture, such as water gas, is introduced at 12, with a partial concentration of hydrogen greater than 0.50, and if the gaseous products are removed through the two openings at 1 and 2, then two currents of gas will be obtained, passing through two different zones. It is possible in this way to obtain a gas from coal which is much richer in hydrocarbons than that which is obtained by the ordinary distillation of the coal.

This process is patented in French patent No. 563,519.

SELLING APPLIANCES TO NEW RESIDENCES

(Continued from page 268)

and call their attention to it and suggest that they put in new gas appliances at the places I indicate on the plan.

"This sort of a thing always interests the prospects. It interests them to know that I have visited their homes and it interests them to see the little plans I've drawn and it also interests them immensely to hear my suggestions as to places where they should place gas appliances.

"All the time that I am doing this I am emphasizing the fact that through long experience I have become something of an expert regarding this matter of the proper placing of gas appliances in a home. Emphasis on this fact makes a deep impression on the majority of the prospects. They feel that it would be to their advantage to rely on my judgment in the matter. And so it is a comparatively easy matter to sell gas appliances to such prospects, whereas if I simply went after them in the ordinary way I might not be able to sell them at all."

Spends a Lot of Time With Each Prospect

"When I first started in on this job of selling gas appliances," said an enterprising Middle Western salesman, "I went on the idea that the more people I called on the more sales I would 'expose' myself to. Consequently I kept running around the territory just as fast as I could all the time. I'd rush in on one new home-owner and suggest that he buy some gas appliances from me. Then, after getting turned down quickly, I'd rush right away to some other new home or new home-owner and go through the same thing all over again.

"I figured that in this way I'd be seeing the maximum number of good prospects all the time and that I would, therefore, be sure to make a very considerable number of sales all the time.

"But business didn't come to me in the way that I figured it should come. In fact, there was mighty little business at all, in spite of all my constant hurrying back and forth. It was evident that I was on the wrong track some way and I set myself to figuring out what the trouble was.

Business Starts to Pick Up

"After I'd tried just about everything else, I decided that, perhaps, business would be better if I spent more time with each individual prospect. Accordingly, I changed my tactics and started spending considerable time with every new home-owner or new home occupant that I called on. And, right away, business began to pick up and it's been very good, indeed, ever since.

"Now I go on the principle that it's not the number of calls per day that is the most important thing in selling gas appliances to new home-owners or occupants; I go on the principle that it's the high average percentage of sales per call that is the most important thing. So I take plenty of time for each call. I try to make myself spend at least a half hour with each prospect upon whom I call, no matter whether the prospect is rather antagonistic to me or not. Spending that much time on each call means that I have plenty of time to present my proposition in style and get fully acquainted with the prospect, and all that sort of thing. Since I've started this plan of spending at least a half hour, if it is at all possible to do so, with each prospect, my business has increased greatly. In fact, it is now just about everything that I could want it to be."

Interesting, isn't it?

And aren't there several worth-while ideas and suggestions in all this that you could use to good advantage in your own business, Mr. Salesman, in selling more gas appliances to the owners and occupants of new residences?

A. G. A. CHANGES DATE OF SPRING CONFERENCE

May 22 and 23 have been definitely decided upon by the American Gas Association for the Spring, 1925, conference, to be held at Atlantic City.

Catechism of Central Station Gas Engineering in the United States

Installment No. 63

(Continued from last week)

Since the illuminants are assumed to be 80% ethylene and 20% benzene the percentages of each assumed to be contained in the gas is $4.85 \times 0.80 = 3.88\%$ of ethylene and $4.85 \times 0.20 = 0.97\%$ of benzene.

100 cu. ft. of the illuminating gas under consideration, therefore, contains, according to the assumption stated,

3.88 cu. ft. of Ethylene
0.97 cu. ft. of Benzene
7.25 cu. ft. of Carbon Monoxide
48.15 cu. ft. of Hydrogen
35.72 cu. ft. of Marsh Gas

and the calorific value derived from the quantity of each of the components contained in 100 cu. ft. will be

Ethylene	$3.88 \times 1621 =$	6289 B.t.u.
Benzene	$0.97 \times 3732 =$	3620 B.t.u.
Carbon Monoxide..	$7.25 \times 325 =$	2356 B.t.u.
Hydrogen	$48.15 \times 328 =$	15793 B.t.u.
Marsh Gas	$35.72 \times 1016 =$	36292 B.t.u.
Total		64350 B.t.u.

The calorific value per cubic foot of the gas is therefore 643.5 B.t.u.

In round numbers 15% of the calorific value is derived from the illuminants, 4% from the carbon monoxide, 25% from the hydrogen and 56% from the marsh gas.

Calorific Value of a Gas

318 An illuminating gas has the following composition by volume:

Carbon Dioxide, CO_2	2.7%
Oxygen, O_2	0.7%
Heavy Hydrocarbons, Cn H_2n	12.8%
Carbon Monoxide, CO	30.7%
Hydrogen, H_2	32.4%
Marsh Gas, CH_4	13.9%
Higher Paraffins, CnH_2n plus $_2$	2.4%
Benzene Vapor, C_6H_6	0.6%
Nitrogen, N_2	3.8%

Calculate the calorific value per cubic foot, assuming the heavy hydrocarbons to be Olefiant Gas, C_2H_4, and the higher paraffins to be Ethane, C_2H_6. Calculate also the amount of heat available when the water produced by combustion remains as vapor as explained in the answer to question No. 315.

Ans. The calorific value per cubic foot of an illuminating gas can be calculated, when the composition by volume of the gas is known, by multiplying the calorific value per cubic foot of each combustible constituent of the gas by the volume of such constituent contained in a cubic foot, as shown by the analysis, and then adding together the products of these multiplications, the sum obtained by this addition being the required calorific value per cubic foot of the gas.

The combustible constituents of the gas, the analysis of which is given in the question, are the Heavy Hydrocarbons, which are to be considered as being Olefiant Gas, C_2H_4, Carbon Monoxide, CO, Hydrogen, H, Marsh Gas, CH_4, the Higher Paraffins, which are to be considered as being Ethane, C_2H_6, and the Benzene Vapor.

The Calculation

The values per cubic foot for these various gases are as follows:

	Calorific value	Heat available with water as vapor
Heavy Hydrocarbons taken as C_2H_4..	1,621	1,515
Carbon Monoxide, CO	325	325
Hydrogen, H_2	328	275
Marsh Gas, CH_4	1,016	910
Higher Paraffins taken as C_2H_6.....	1,772	1,613
Benzene Vapor, C_6H_6	3,732	3,572

Therefore, the calorific value of the gas is $(1621 \times 0.128) + (325 = 0.307) + (328 \times 0.324) + (1016 \times 0.139) + (1772 \times 0.024) + (3732 \times 0.006) = 207.5 + 99.8 + 106.3 + 141.2 + 42.5 + 22.4 = 619.7$ heat units, and the heat available with water as vapor is $(1515 \times 0.128) + (325 \times 0.307) + 257 \times 0.324) + (910 \times 0.139) + (1613 \times 0.024) + (3572 \times 0.006) = 193.9 + 99.8 + 89.1 + 126.5 + 38.7 + 21.4 = 569.4$ heat units.

As stated in answer to question No. 317, the exact composition of the hydrocarbons grouped in the analysis under the respective designations of "Heavy Hydrocarbons" and "Higher Paraffins" is not certain. It is probable that the calorific values assumed for these groups are lower than the actual values and that therefore the calculated calorific value of the gas is lower than the value that would be shown by a calorimetric test. Many gas analysts and physicists use a calorific value of 2,000 B.t.u. per cubic foot for both these groups. Whatever values are assumed the calculated calorific value of a gas as complex as is illuminating gas is always of doubtful accuracy as compared with an actual determination by means of a calorimeter.

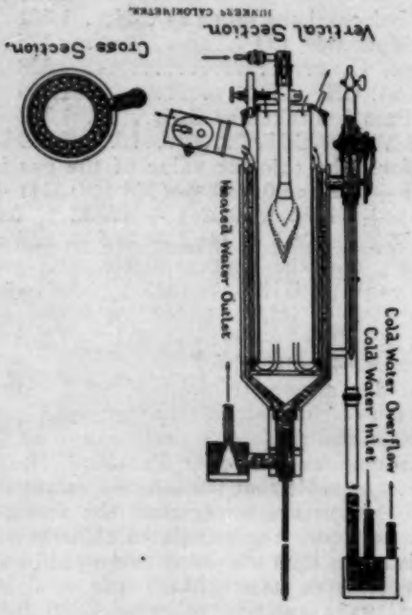
Under the assumptions made, 44% of the calorific value of the gas is derived from the heavy hydrocarbons, higher paraffins and benzene combined, or, in other words, from the total illuminants, 16% from the carbon monoxide, 17% from the hydrogen and 23% from the marsh gas. Of the heat available with the water in a state of vapor 45% is derived from the illuminants, 18% from the carbon monoxide, 15% from the hydrogen and 22% from the marsh gas.

The Calorimeter

319. Describe some form of calorimeter by the use of which the calorific value of gas can be determined by observation.

Ans. The calorimeter that is most commonly used in this country for determining, by observation, the calorific value of gases, is an improved form of the Hartley Calorimeter, designed by Hugo Junkers and known as the Junkers Calorimeter. It acts by transferring the heat developed by the combustion of a measured quantity of gas to a measured quantity of water which flows at a constant rate through the apparatus.

The calorimeter itself is an annular vessel made of two concentric copper cylinders, the outer cylinder having a diameter of about seven inches and the inner one a diameter of about four inches. To the top of the outer cylinder is fitted a conical hood which closes the whole top of the vessel, except for a circular opening left at the apex of the cone. A smaller hood which begins as a frustrum of a cone



Junkers Calorimeter

with its base upwards and then changes to a cone with its apex upwards, it attached to the inner cylinder so that the annular space is continued up between the two hoods and the space within the inner cylinder is shut off at the top from this annular space. The bottom of the inner cylinder is left open and the bottom of the annular space is closed by a ring. At a distance of four or five inches above this ring is fastened another ring forming a water-tight partition which divides the annular space into two compartments. Through the upper one of these two compartments pass a number of small copper tubes, the upper ends of which are fastened to tse diverging cone of the inner hood while the lower ends are fastened to the partition described above. The joints between the tubes and the hood and partition must be water-tight.

Description of Apparatus

Into one side of the outer cylinder, just above the bottom of the upper compartment, opens a copper pipe set at a right angle to the axis of the cylinders. This pipe enters the side outlet of a tee piece set with its run vertical and about two inches from the cylinder. From the lower outlet of the tee the pipe is dropped a short distance and then passing around a U-shaped turn rises to a height of about 20 in. above the top of the annular vessel and ends in a small cistern or cup formed inside of a larger one, both cups having a common bottom supported by the pipe. To the part of this bottom covered by the small cup is attached a corrugated nipple, over which a rubber tube can be slipped, and a similar nipple is fastened in the space outside of the small cup. The upper outlet of the tee is closed by a rubber cork pierced for the insertion of a thermometer. A stop cock provided with an arrow-shaped handle, moving over a graduated quadrant, is placed between the tee and the bend. Opposite the opening of the pipe in the outer cylinder is placed a baffle plate forming a small annular space extending completely around the cylinder, the object of which is to cause the water entering through the pipe to be uniformly distributed all around the annular chamber.

To the circular opening left, as described above, at the apex of the outer hood, is fitted a copper tube provided with several baffle rings with center openings. This tube ends in a tee piece, the upper end of which is closed by a cork pierced for a thermometer, and from the side outlet of this tee runs a pipe which ends in and supports by its side a cup. Inside the cup is a funnel ending in a nipple for tubing, which passes through and is fastened with a water-tight joint to the bottom of the cup.

On one side of the lower compartment of the annular space is an elliptical opening leading into a tube of the same cross section. Provision is made for the insertion of a thermometer into this tube as close as possible to the outer cylinder, and it is also fitted with an ordinary stove pipe damper. At a point diametrically opposite to this tube a small tube is tapped into the bottom ring, and directly under it is tapped in a rod which serves to support the burner through which the gas is consumed.

(Sixty-fourth Installment Next Week)

FUEL OF THE FUTURE—WHAT SHALL IT BE?

(Continued from page 266)

same, and the second stage consists of a heat treatment which develops the properties of both the surface and the core of the metal.

Here, again, we have a process in which temperature is of great importance, and hence it is a field particularly well suited for gaseous fuel. Besides temperature, the character of the steel, the nature of the product that is to be dissolved in it and the time of contact between the steel and the carburizing agents are of importance. The effect of different constituents that are found in steel, the conditions that govern the selection of carburizing agents, which may be hydrocarbons, carbonates, carbon monoxide gas, and the like, are matters of a highly technical nature which concern the steel man primarily, and which will not be discussed here.

The Temperature

But the temperature is of importance to the gas engineer and he should be cognizant of the conditions that surround and control this part of the case carburizing process. Control is again of significance in this consideration. Oscillating or varying temperature is a matter of prime importance. Temperature also controls the depth of penetration of the carburizing action, and the different cements used are influenced to a certain extent by the temperature, resulting in the production of different hardening effects. Carburization may be carried out both at low and at high temperatures.

The type of furnace used in the operation is also of importance. The furnace should be so designed that it is possible to attain the temperature of carburization quickly, even if it be as high as 2,000 degrees F. Uniform temperature conditions should prevail in the apparatus and furthermore the atmosphere within the furnace should be non-oxidizing.

These conditions clearly point to gas as the logical fuel for case carburizing. The fuel must be carefully controlled and the temperature must be regulated accurately within certain limits. Thus, at the start of the heating process the increase of temperature up to 1,300 degrees F. should be gradual and then beyond that temperature the heating should be uniform over all parts of the carburizing box. These conditions can be secured with the aid of gaseous fuel.

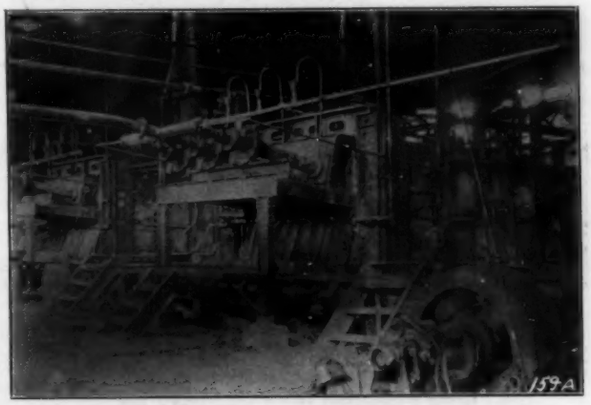
Cyanide Hardening

A word must be said about cyanide hardening. This is a superficial hardening process in which the hardness of the metal extends for a minute depth only, not more than a few thousandths of an inch. Cyanide hardening is carried out on low carbon on machinery steel where great resistance to shock is not required. The hardening is accomplished by immersing the metal in a bath of liquid potassium cyanide followed by quenching. It may also be carried out by coating or sprinkling the surface of the metal with an adhesive mixture of a finely pulverized salt of cyanogen or a varnish, and then heating the steel to the proper hardening temperature, thus melting the cyanide on the surface of the metal. The immersion method is said to be the more effective of the two.

Pack Hardening

Pack hardening is a process that is employed for treating fine threaded tools and other tool steels. It is also a superficial hardening process and raises the carbon content of the steel on the surface, so that the steel may then be hardeened in oil in the place of water. The steel is packed in certain materials such as carbon, charred leather, charred hoofs and horns and the like. The temperature of the heating process must also be carefully controlled.

Nothing has been said regarding the after-treatment of the heated metal. The metallic articles are cooled down and the methods that are employed in this part of the process also have great effect on the properties of the finished metal. However, the gas engineer is not really concerned with this part of the heat treating process and hence it is not necessary to describe its details.



A Gas Burning Installation in a Steel Mill

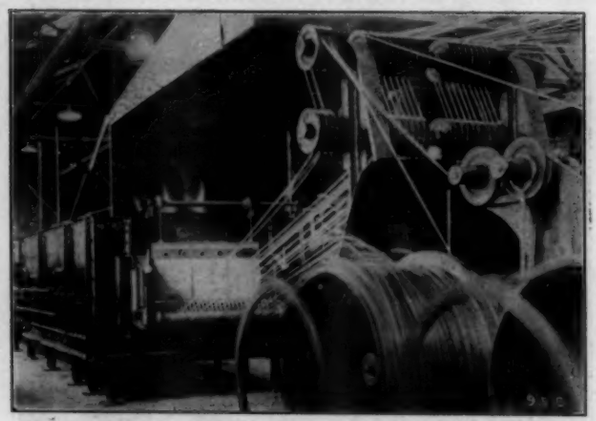
Forging

Forging is not strictly a heat treating process, but so much depends on the manner in which the metal is forged, from the standpoint of the results obtained in subsequent heat treatment, and the process itself is one in which heat is used, that it was thought advisable to say a few words about it here. Forging is the shaping of the metal under the forge hammer while the former is at a comparatively high temperature. The metal is first heated in forge furnaces and then put under the hammer. The forge furnace must be very carefully designed and the heating medium employed must be so selected that perfect control of the temperature is possible at all times. Uniformity of heating and the attainment

of the proper temperature within the furnace, as well as the proper handling of the metal under the hammer, are what determine the effectiveness of the results of subsequent heat treatment of the forged articles. It is important for the gas engineer to realize that in this connection he may find a very poorly designed furnace in which the heating is carried out and that in order to make it possible for the manufacturer to gain the best possible results from the use of gas as a fuel it will be necessary to redesign the furnace so that the combustion of the gaseous fuel is properly carried out and the material is heated in the proper manner. Many times it will be found that the forge furnace is a makeshift affair, put together by someone who knew how to lay bricks. Such an apparatus cannot give proper results, even with gaseous fuel, not to mention the others that might be used in it.

Steel Wire

A word must also be said about the manufacture of steel wire, in which four separate processes involving heat treatment are carried out, namely, annealing, patenting, hardening and tempering. Patenting is a special form of the annealing process. The operation is carried out in a furnace of special construction and is continuous. The operation consists of heating the metal to the proper point, depending on the character of the same, and then rapidly cooling.



Wire Patenting With Gaseous Fuel

General Details of the Heating Process

One of the first things that the industrial gas engineer will find when he enters this field is that there is no such thing as a furnace which can be used for every case. In fact, it is far more probable that he will have to treat each case separately. Each heat treatment operation will have certain peculiar conditions of its own, not so much from the standpoint of the heat treating operation itself, for these are well standardized, but because of the peculiar character of the product being treated. Hence a careful study must be made of each individual case and it will then be found that a solution is always possible with gas as a fuel if the proper ingenuity is applied and a proper knowledge of what is being done is available.

In general, the gas engineer will have to study the heating operation in four separate parts, viz., 1, the generation of heat—the fuel; 2, the system for applying heat—the furnace; 3, the utilization of heat—the uniform heating of the stock, and 4, the conservation of heat—guarding against losses.

It must be remembered that, in this case, as well as in all cases of heating, it is not the thermal value of the original combustible that counts, but the British Thermal Units in the combustible mixture and the products of combustion.

This concludes the description of the heat treating processes. The details that have been given will enable the gas engineer to understand the operations that are carried out in the plants that employ heat in the treatment of metals. It will enable him to tackle the problem of the substitution of gas for other fuels commonly used in these processes with a better chance of success than if he were not informed of these details. What has been included in these articles is by no means all that he should know concerning heat treatment, for there are many cases in which special treatments are carried out on special metals and special steels, such as the alloy steels, but in general the procedure is the same, only certain details varying. This holds good, not only for the alloy steels, but also for the other metals, such as silver, nickel, brass and the like, which are also heat-treated. Time is wanting to go into details regarding these metals and the alloy steels as well. The reader is referred to Bullen's Steel and Its Treatment for further information on the heat treatment of alloy metals.

Heat Regeneration

The question of regeneration is also of importance. Generally speaking, it is always advisable to recover heat values in the waste gases. Sometimes it is absolutely necessary to do so in order to attain the proper temperature in the products of combustion. Thus, for example, it is absolutely necessary to preheat both the gas and air, if not either one of the two, before combustion when using producer gas; otherwise the proper temperature within the furnace will not be reached. When the gas contains a higher thermal value, it follows that there will be still more heat in the waste gases of combustion to be recovered and heat recuperation and recovery becomes, if anything, more important.

We have said much regarding uniformity of heating. This cannot be secured unless the fuel is of uniform composition. Gas has a very great advantage over most fuels in this respect, in that its composition rarely changes and it can always be relied upon to give the best results in the heat treating operations. Furthermore, it is a fuel that contains

practically no sulphur or sulphur gases, which is also an important advantage over other combustibles. For the presence of sulphur in the fuel has a very deleterious effect on the metal being treated.

The Operators

Of course, no matter how perfect the fuel may be, nor how well constructed the furnace in which it is used, nor how automatic the devices for controlling temperatures and other conditions are, it still remains a fact that a good deal of the success obtained in a heating operation depends on the character of the operators who control the furnaces. A great deal depends on their skill and their conscientiousness in tending to their jobs. In other words, the human element in heat treating of metal is a potent factor that must be reckoned with at all times. A certain amount of skill is required in the heating treatment of metal and in certain instances a great deal. This must be acquired by the operator if the proper results are to be obtained. But it is also true that if the furnace has not been designed in the proper manner, and if the fuel is not suitable. even the skill of the most experienced operator will not be sufficient to prevent spoilage of the articles that are being heat treated. Thus it appears that the prime essentials of the heat treating process are a properly designed furnace, a fuel possessed of the proper qualities, easy to control, etc., and operators who have the requisite skill to know how to use both to good advantage.

The Furnace

A great deal may be said regarding the design of the furnace. There are well defined principles along which furnaces are constructed, and for the treatment of ordinary steel products the design is quite simple. On the other hand, when large masses and weights of material are handled, special equipment is necessary to lead the articles into and through the furnace. In general, there is a tendency towards continuous operation in heat treatment. Thus the gas engineer may be required to perfect the heat treating process, not only from the thermal, but from the mechanical side as well. Fortunately, he is able to call to his assistance manufacturers of industrial equipment who have spent much time and money in studying all the details of heat treatment and who are ready to render available to him all the information that they have on this subject. The co-operation between the industrial gas engineer, representing the gas company, and the manufacturer of industrial gas-burning apparatus, is essential to the success of this undertaking. When these two forces work together, there can be but one result, and that is the development of an industrial furnace, burning gas, which utilizes the fuel to the best advantage and gets out of the gaseous fuel all the important favorable properties that it possesses.

Before leaving this phase of our general subject, the heat treatment of metals, it must be emphasized again that gas is the ideal fuel for the heat treating operations. It is a fuel that is economically and technically the superior of all fuels that are now being used for this purpose, even electricity. It is the fuel that the manufacturer of steel articles will want when it is represented to him in the proper manner. And this, we may say, applies as well to the other branches of heat treatment in which other metals are processed.

SELLING UTILITY STOCK BY AND TO WOMEN

(Continued from page 272)

nership, while a bond is what you might call a mortgage entitling the holder to first claim on the property. True enough, partnership involves risks of the business, but risks in the utility business have been largely eliminated. The state commission protects the investors also by demanding to know everything about the earnings and capitalization. New issues of securities can be put out only after investigation and approval by the state commission. Another item of safety is the fact that the company operates practically on a cash basis. There are no large inventories. A utility company's products are consumed as soon as produced.

Know Company's Record

Know something about the territory the company serves and about the properties with which it renders this service. Know how much company property is behind each share of stock. Learn what the total income was for the last year and how much of it was available for dividends. A good statement to be able to make is that the dividends were earned on this stock more than three or four times during the past year.

Persistency

Persistency. One of our staff called eight times on a single customer to be told each occasion that the customer positively did not have any money to invest. On the ninth call, she sold 195 shares of stock. Persistency is a trait of women, although the men sometimes call it by another name—stubbornness.

The customer is always interested in what she is going to get out of it. Talk enthusiastically about the pleasure of getting dividend checks. Describe how many business women and housewives are using these checks to help meet current expenses and how others reinvest. Many mothers are building up a fund which will put their children through college.

Sympathy

Sympathy. Naturally, you have to get pretty close to a woman before she is willing to put her hard-earned savings into your hands for investment. Be willing to listen to her. You would be surprised

to know how much of our time is spent listening to the troubles of the women who buy stock from us. The trick is to keep applying the principle of saving to the matter in hand. One thousand dollars now invested and the dividends reinvested regularly will double itself in ten years.

There are many personal aspects connected with this work. Our women render many personal services of all sorts. They make payments on stock for customers, attend to legal matters, shop for them; they do everything except take care of the house and mind the baby, and I am sure they would do that if it would result in a sale.

Sell the Thrift Idea

Keep the prospect sold on the thrift idea, consistently setting aside a certain amount each month. Budgets are planned for housewives, always with the idea of setting aside the amount to be saved first, because the temptation to spend money is too great to leave the savings to what is left over, and because a great many people have to have some fixed obligation to meet in order to save anything.

It is a practical suggestion that you make a notation of when your client's payments begin and end. The big thing is to keep the client buying steadily—that is the secret of success of the saleswomen who have built up a steady income.

It is always well to place something in your prospect's hand—a thrift folder, sample dividend check or circular of some sort. Make pencil notations before the prospect's eyes so that you can present your arguments visually. Some sales-people make it a rule to bring the order-book into sight at the very beginning of the talk, so that the prospect will become used to seeing it and will not be antagonized when it is finally produced.

CO-OPERATING WITH THE ARCHITECT

(Continued from page 267)

beauty parlors, tailor shops and small manufacturing businesses, where the use of gas appliances effect a considerable saving of space and elimination of dirt and dust, which is so ruinous to stocks and fixtures.

To run piping after floors are laid and walls are finished is costly and unsightly, and has been the means of keeping gas equipment out of the residence and the apartment building; likewise, we are handicapped in commercial and industrial buildings if adequate piping is not provided during construction. On the other hand, if we get adequate piping specified, which will permit taking on additional equipment, and have outlets placed where gas burning appliances can be attached without adding to the installation cost, we have materially increased our chances of selling gas equipment. The increase in domestic consumption per meter will depend, to a large measure, on the piping provided. This also applies to the industrial and the hotel and restaurant consumption.

If you give to this work the same aggressive effort that you give to sales campaigns, and keep everlastingly at it, you will remove many of the obstacles that now confront your salesmen.

Literature Folder

Now, we can further strengthen our point of contact with the architect by furnishing him with some device whereby he can constantly keep our literature in a place ready at hand, and with this thought in mind, a file folder can be used similar to the one I now show you.

This folder contains six pockets or compartments, and these compartments are headed: HOUSE HEATING, WATER HEATING, KITCHEN EQUIPMENT, LAUNDRY EQUIPMENT, METERS AND PIPING, MISCELLANEOUS.

These folders should be in every architect's office and should be a part of his reference file Each compartment should contain literature that is descriptive and informative of the matters that come under the different headings. For instance, under the heading HOUSE HEATING, you should have literature on gas-fired central heating plants, space heaters, gas-steam radiators and garage heaters. Under WATER HEATERS, everything pertaining to storage tank water heaters, and devices for making a tank water heater automatic in operation, and so on with each compartment, so that when information is necessary it is in compact form and very handy for quick reference.

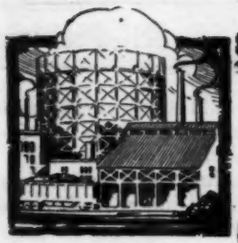
The American Gas Association has adopted this folder, and it can be subscribed for through that association.

Servicing the Folder

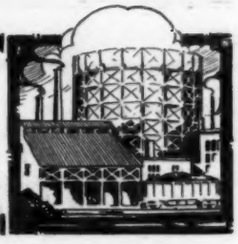
Regarding the servicing of this folder, it was decided that, because of the different makes of appliances that are handled by different companies, it would be difficult to have this servicing work done by the American Gas Association, because of the great amount of literature that they would be required to keep in stock, and it was thought best to have each company service its own folder.

I have tried to tell you in a few words what this work means as an aid to business. By being on the ground to tell the story of modern gas appliances, you will enlist the architect as a booster for your merchandise and product, and his word will have considerable influence with the owner who purchases the equipment.

Now bear this in mind, an Architect and Builders Service Section is a mighty important adjunct to any progressive public utility, because it is rendering the architect and the builder a valuable service, and by means of this service it is creating better relations with our public, and I assure you that if you go after foundation work systematically and thoroughly, you will find that the realization of our aim, which is an increase in gas sales, will be more easily accomplished.



NEWS OF THE GAS INDUSTRY



Enthusiasm for Gas Lighting

The Keynote of the March Meeting of Gas Sales Association of N. E.

One hundred and fifty members of the Gas Sales Association of New England listened to interesting talks regarding gas lighting at their regular monthly meeting held at the Boston City Club, Boston, Mass., on Friday, March 13.

Mr. E. J. Cooney, chairman of the Committee on Gas Lighting, had charge of the meeting, and his opening remarks paved the way for a most interesting and instructive meeting.

He called attention to newspaper articles regarding the use and advantages of electricity and he urged the members present to push the gas lighting idea and the use of gas in the home. The keynote of his address was enthusiasm.

S. B. Palmer Addresses the Meeting

The first speaker of the evening was Mr. S. B. Palmer. He said, in part:

"I might as well take as a text for the subject tonight the old and well-known one: 'Let your light so shine that others may see your good works.'

"From the answers to the questionnaires which were sent out on gas lighting, I think you will agree that the outstanding impressions these answers give are:

First: The uncertainty on the part of the gas companies as to the amount of gas lighting they have; and

Second: The value of such gas lighting as they do have to the gas companies.

"With the electric companies working hard to get all they can of the lighting, and combinaiton companies assisting in wiring campaigns to replace gas lighting, it has come to pass that the straight gas companies in many instances have been carried with the current (no pun intended) which has evidently been so strong as to carry straight gas companies' organizations away with the idea that gas was not a proper medium to use for light.

Original Business Was Lighting

"Gas companies were formed originally to sell gas for lighting and were fairly prosperous and grew even when lighting was their main outlet, and they went to extremes to get consumers, the expense of which was charged to the cost of distribution. Ten years ago lighting was in a very healthy condition and received a great deal of attention from the operators of gas companies, and was considered fully as important as the cooking load.

"With the late war came a letting up in service and house maintenance was abolished at the time it was most needed to take care of the troubles incident to the changes in type of gases sent out.

"The consumers were dissatisfied with conditions and the electric companies were not slow to take advantage of the opportunity and begin their campaigns of relieving the gas companies of this neglected part of the business, and then, finding so little opposition, they start in to take the gas range load, not necessarily with an electric range, but with irons, toasters, coffee percolators and various other appliances that use heat.

"Another result has been the eliminating of gas piping except for kitchens, thus making it still harder to sell gas appliances to burn gas.

Holding Lighting Business

"Within the last ten years many of you have grown to look on the light side of your business from the dark side. Many of you think that gas lighting is not worth any effort or expense to hold it, even if it could be done, whiie a few are making an effort to save what they can, as these few realize that the gas lighting load is still a large item with them and worth what it costs them and they believe in letting their light shine.

"I know what it means to hold your gas lighting or to sell more and so do you gas men. It means hard work, intelligently carried out, service to customer not only at the plant, but in the homes as well. It means expense to be borne by the commercial department, with no credit to offset it, as the credit goes to the plant in increase of the gas output, not only from the lighting, but because of the gas used for other purposes when the house is piped for gas. It means that the managers and directors must be shown these facts and unless you are in possession of the knowledge of conditions you can not hope to convince them that there is profit in going after the gas lighting, but it should be clear in your minds that the expense must be met from the sale of gas and not from the sale of lights, as some have tried to do in the past.

"To be perfectly frank with you, I do not know the real value to your companies of this lighting load or the value of having gas piping throughout the house. Neither do I know what it would cost to give the service needed. It is quite a problem to study and figure out intelligently just what the real value of a lighting customer is because of the different angles we have to judge from.

here who I think could shed some

"There are several gentlemen here who I think could shed some light on the problem and there are many here who would be surprised at the high value placed by some executives on gas lighting, which they still look on as an asset to their business.

Pushing Gas Lighting

"I know of no better way or cheaper method to use for making the public realize that gas can be

depended on at all times and for all purposes where heat is used, as well as for light (and sometimes that is the only kind of light in evidence) than by pushing gas lighting.

"Semi-indirect lighting, wall brackets and pendants have a place in the homes, with upright burners on the brackets and inverted burners on the pendants, but they must be kept in condition if you wish them to remain there and burn gas.

"There are large possibilities still in the lighting field such as replacing obsolete lights, as well as brackets and fixtures, with more modern types, auxiliary lighting in public buildings, theaters and stores.

"A very simple and effective method of lighting theaters is accomplished by placing junior lights around the walls, equipped with small angle shades, which reflect the light toward the wall. These would act as emergency exit lights and should be used throughout each performance. This makes the surest and best method I know of for this purpose.

"Your customers should be kept informed as to the reliability of the gas light, and if gas is installed in a public building or theater, find a way to let people know about it. if you have to print it on the back of the gas bills.

Auxiliary Lighting

"Auxiliary store and factory lighting are important outlets, because they not only bring in some revenue, but are an advertising medium as well.

"Auxiliary lighting, even by combination companies, has its value in the time of trouble, which may be greater and more apparent as time goes on, and a dual lighting system might come in handy at a critical as well as a dangerous time for your customers.

"Unless the public sees gas lighting in the streets, stores and factories, there is little to remind them that there is such a thing, and they are not interested in having gas in their homes. I have heard some say that the auxiliary lighting was of doubtful value to a merchant because the gas lamps were not in operation condition when needed.

"If the lights are to be used for emergency only, they should be on the same basis as insurance of other kinds, that is, the lights should be kept in readiness at all times and the necessary amount charged to the customer, who can be sold the idea of classing this insurance with his sprinkler system, burglar alarm and other insurance.

"When properly maintained, gas lighting should not be harder to sell than a farm lighting storage system, which is being installed in many places where the laws require two independent systems of lighting.

Selling the Architect

"As for gas piping in stores and office buildings, I would suggest that the American Gas Association try to sell the idea to the architects that office buildings and theaters as well as certain types of houses should have gas pipes installed when the building is under construction.

"A great many large buildings have been erected in recent years with no thought of any gas until the building was completed, and then it was a tough proposition to handle, as well as costly. If the fact that the architect had allowed this to happen in his plans were known, he would lose considerable prestige and also business on future undertakings.

"In mentioning the retail prices charged on semi-indirect fixtures and some other lighting equipment, I know I am opening a question that has two sides. The time has arrived when you cannot add 100 per cent to the cost of the fixtures and hope to sell very many. There was a time when selling campaigns with special men hanging fixtures on trial added considerable to the selling cost and, in order to get good men and make a success of the campaign, it was necessary to put a high price on the fixtures. That time is past, but many companies are still selling at the prices intended in the past to cover high commissions for salesmen and maintenance of fixtures, which in many instances brings the price to the consumer much higher than it would naturally be, and higher than the customer will pay, particularly when he loses the free service of the past."

At the conclusion of Mr. Palmer's address, a general discussion followed in the interests of gas lighting. Attention was called to the work of the Springfield Gas Light Company in obtaining gas lighting in a block of stores on Main street, Springfield, Mass. This is a good example for other gas companies to follow.

Reorganization at Lowell

A reorganization has taken place in the Lowell Gas Light Company of Lowell, Mass. Charles R. Prichard, vice-president, and Edward J. Cooney, sales manager, leave the company along with several other officials. John L. Eigenbrot becomes general manager. Mr. Prichard goes to Lynn as the vice-president of the Lynn Gas & Electric Company.

Both Mr. Prichard and Mr. Cooney are well known gas men. There is no doubt but that Lowell will miss them both. What the people of Lowell think of Mr. Cooney may best be seen from the following item clipped from one of the Lowell newspapers:

"He did it (improved relations between company and community) largely through the medium of personal missionary work. He talked gas whenever he could do so without forcing the subject. He'd rather bend his ear to criticisms of the company than to let them go unanswered. He invited the kicks and in a great majority of cases he was able to take the sting out of them by a straight-out explanation of what was what. His time was largely taken up by the work of defending the company against unjustifiable attacks, and he was enabled to do this because he was acquainted with so many people here."

R. H. Burdick to Go With Battles & Company

The Journal wishes to record as an item of interesting news the resignation of Mr. R. H. Burdick from the Electric Bond and Share Company of New York. For the past 13 years he has functioned as chief gas engineer of the Electric Bond and Share Company, handling the operation and engineering of some 40 gas properties, together with a series of Diesel engine equipped electric plants and numerous ice plants.

Mr. Burdick is joining Battles & Co., of Philadelphia and New York, and we understand will continue to be identified with public utility affairs.

In the near future we hope to make further announcement of Mr. Burdick's new activities, which should be of marked interest to his host of friends who have followed his interesting career in the gas industry.

Illinois Light & Power Corp. Holds Annual Meeting

The annual meetings of the Illinois Power & Light Corporation and its subsidiary, Illinois Traction, Inc. (Illinois Traction System) were recently held in Chicago. The president, Mr. Clement Studebaker, Jr., presented the annual report for the calendar year 1924, showing the progress made in these properties operating in the states of Illinois, Iowa, Kansas and Nebraska.

The old officers and directors were re-elected, with the following changes:

Mr. E. A. Cudahy, Jr., of Chicago, vice-president of the Cudahy Packing Company, was elected director of the Illinois Power & Light Corporation to succeed Mr. H. E. Chubbuck of Peoria, Ill. Mr. P. C. Dings of Chicago, one of the directors, was elected treasurer, to succeed Mr. George M. Mattis of Champaign, Ill.

Large Attendance Enjoys Attractive Program at 21st Annual Meeting of the Association

The fifth joint convention of the Illinois Gas Association, the Illinois State Electric Association and the Illinois Electric Railways Association was held in Chicago on March 18 and 19, 1925. This was the 21st annual meeting of the Illinois gas men.

A very comprehensive program was provided for these meetings. On the morning of each day all the utility men met in common and listened to addresses on general subjects which pertained to all the branches of the utility industry. In the afternoon each section met in separate session.

The papers that were read in the afternoon meetings dealt with various phases of the gas industry and were each followed by good discussion.

An interesting paper read in the morning session of Wednesday, March 18, was that by Verne Joy, the publisher of the Evening Sentinel of Centralia, Illinois. This paper was entitled "The Utility Business from an Editor's View Point." Mr. Joy brought out the fact that there was too much red tape binding the utility men and that it should be done away with. The paper was written in a witty tone and was very well accepted by the meeting. Another important point brought out in the morning meeting was the fact that the universities are co-operating with the public utilities. An address, delivered by B. J. Mullaney, of the Peoples Gas Light & Coke Company, which dealt with the education of the employees and the necessity of a definite program in each company, was of great interest to the meeting.

An interesting feature which followed the Wednesday morning meeting was the Group Luncheon. This was more or less of an innovation. Tables were arranged for executives, superintendents, accountants, engineers, metermen, etc. with the idea of grouping all men from the same division of work at the same table, so that they all may become better acquainted with each other and find out what the other fellow is doing in different parts of the state.

The Banquet

On Wednesday night a banquet was held and the attendance was well above 900. The toastmaster at the banquet was Wilbur D. Nesbit and speakers were Martin J. Insull, William A. Baehr, Marshall E. Sampsell and Bentley E. Hamilton. The dinner was followed by an Annual Review and "Voodvill."

New Officers

The officers elected for the coming year were as follows:

President—R. E. Chew, vice-president of Union Gas & Electric Company, Bloomington, Ill.

Vice-president—W. A. Bertke, manager Gas Department, Southern Division, Illinois Power & Light Company, East St. Louis, Ill.

Secretary and treasurer—R. V. Prather, Springfield, Ill.

Director one year—John G. Learned, vice-president Public Service of Northern Illinois.

Directors, two years—F. F. Cauley, Peoples Gas Light & Coke Company, Chicago, Ill., and R. B. McDonald, general manager, Peoples Power, Moline, Ill.

The McCarter Medals

Through the generosity of Mr. Thomas N. McCarter, president of the Public Service Electric & Gas Company of New Jersey, the American Gas Association offers an award of medals and certificates for the successful resuscitation by employees of member companies of this association, of persons asphyxiated by gas by the use of the Schafer Prone Method of Resuscitation. Such awards are made upon recommendation of the American Gas Association's

Accident Prevention Committee and with the final approval of its executive board.

It is very gratifying to state that an award of a McCarter medal and certificates will be made at this time to gas company employees of an Illinois company.

Mr. Willis M. Beardsley, local manager of the Central Illinois Light Company, Pekin, Ill., on November 27, 1923, resuscitated Mr. Charles Grossweiler an employee of that company. Mr. Grossweiler was overcome while making a connection of a two-inch main to four-inch steel pipe in a ditch three feet six inches deep when he failed to bag off one of the three lines feeding gas to this point. Mr. Beardsley who was the first on the scene of the accident, applied the Prone Pressure Method of Resuscitation upon arrival and was later assisted and relieved by Mr. William Richmond, an employee of the Central Illinois Light Company, and also Mr. W. E. Stout, a former employee of that company.

It is very pleasing to award Mr. Willis M. Beardsley at this time on behalf of the American Gas Association a McCarter medal and certificate in recognition of his having saved human life and also to award Mr. William Richmond a McCarter certificate for assisting Mr. Beardsley in this deed. Mr. Stout is no longer an employee of the Central Illinois Light Company, but he will, however, be sent a certificate in recognition of his assistance.

Gas Sales Association of New England Offers Prizes on House Heating

At the Gas Sales Association of New England meeting, held in Boston, Mass., on March 13, it was announced that the association was pleased to be in a position, due to the kindness and generosity of some friends of the industry who are anxious to see the gas industry get the maximum business benefits from gas heating, to make the following offers:

A first and second prize of $100 and $75, respectively, to the New England Gas Company employee presenting the best report that can be used as Sales Manual by others during the summer and fall.

The points of merit of the reports to be determined by their value as sales helps to other gas company employees in obtaining future heating installations. Contest to close at noon, May 1.

The above prizes are to be awarded at the annual Gas Sales meeting in May.

Window Display

A first and second prize of $100 and $75, respectively, is offered for the best window display of heating equipment made between now and October 1; prizes to be determined from 8x10 photographs and descriptions of not over 500 words, number of photographs or displays submitted by an individual company not limited.

Photographs and descriptions to be submitted to the committee on or before noon of October 15, 1925.

At the November meeting of the Gas Sales Association prizes will be awarded to the Commercial departments of the winning gas companies, to be distributed or allocated among their salesmen by them.

Two prizes of $50 each to be offered for the sale of the most heating equipment made during the calendar year of 1925 on the following conditions:

One prize to be awarded to companies having a rate available for heating of less than $1 per thousand.

The other prize to be available to companies having a rate of $1 or over or modified division.

Number of installations per thousand meters and total sales value on installations made, both to be taken into account by committee in making awards. Sales value to include gas piping, flue piping, thermostat installations where these items are included in lump price of equipment sold complete, installed, ready for use.

Apparatus and appliances to be considered as heating equipment, steam, vapor and hot water boilers, hot air furnaces, radiators and radiantfires, provided they are permanently installed with rigid connections.

In event of tie, vented or thermostatically controlled appliances to carry preference.

Report and description of installations made together with sales value by months to be made to the committee not later than noon of January 15 next.

Report to include statement of number of customers' meters as of December 31, 1925.

Prizes to be awarded to the Commercial departments and to be distributed or allocated among their salesmen by them.

Contracts Awarded

The Washington Gas Light Company of Washington, D. C., has contracted with the Gas Machinery Company of Cleveland, O., for the installation of three 11-foot sets of carburetted water gas apparatus.

Two of these sets will be installed in the East station in the present generator house, adjoining the old water gas sets, with provision for future waste heat boiler.

One set will be installed in the West station in the present generator house and adjoining the old water gas apparatus.

The new equipment will be provided with overhead operating floor, air and steam meters, pyrometers, explosion check valves and other equipment of the latest design.

The gas company is also installing new gas manufacturing and distributing equipment to take care of its ever-increasing load and continue the good service it has always given in the past.

Gas Co. Increases Capital Stock

Associated Gas & Electric Company, Ithaca, N. Y., has filed a certificate in the office of the Secretary of State through J. F. Taafe, attorney, Albany, increasing its number of shares from 800,000 to 825,000 non par value.